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Evaluation Board for Integer-N PLL Frequency Synthesizer

FEATURES

Self-contained board including synthesizer, VCO, and loop filter (1 GHz to 1.7 GHz)
Designed for 1 MHz PFD frequency and 50 kHz loop bandwidth
Accompanying software allows complete control of synthesizer functions from a PC
Battery operated: choice of 3 V or 5 V supplies
V_P supply must be externally driven

GENERAL DESCRIPTION

This board is designed to allow the user to evaluate the performance of the ADF4113HV frequency synthesizer for phase locked loops (PLLs). The block diagram of the board is shown in Figure 1. It contains the ADF4113HV synthesizer, a PC connector, SMA connectors for the power supplies, and an RF output. There is also a low-pass loop filter (50 kHz) and a VCO (Sirenza VCO790-1500T) on board. The evaluation board is set up for a 1 MHz PFD comparison frequency. The reference frequency is provided by a 10 MHz TCXO. A cable is included with the board to connect to a PC printer port. The V_P power supply must be driven externally.

The package also contains Windows® software to allow easy programming of the synthesizer.

BLOCK DIAGRAM

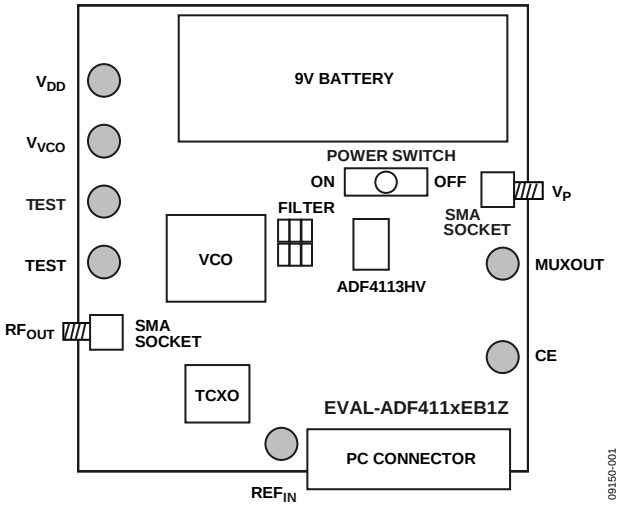

Figure 1.

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REVISION HISTORY

6/11—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

OVERVIEW

The evaluation board is supplied with a cable for connecting to the printer port of a PC. The board schematics are shown in Figure 5 and Figure 6.

POWER SUPPLIES

The board is powered from a single 9 V battery, and an external 15 V source. The power supply circuitry allows the user to choose 3 V for the ADF4113HV V_{DD} and either 3 V or 5 V for the VCO supply. The default settings are 3 V for the ADF4113HV V_{DD} and 5 V for the VCO supply. The supply pin, V_P, must be driven externally via the SMA provided (J10) with 15 V.

It is very important to note that the ADF4113HV V_{DD} should never exceed the ADF4113HV V_P. This can cause damage to the device.

External power supplies can be used for the ADF4113HV V_{DD} and VCO power supplies. In this case, insert SMA connectors as shown on the silkscreen (see Figure 2) and the block diagram (see Figure 1).

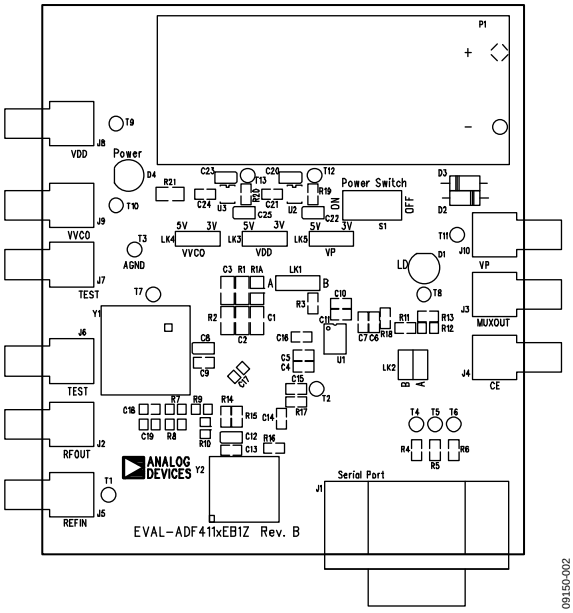

Figure 2. Evaluation Board Silkscreen

LOCAL OSCILLATOR COMPONENTS

All components necessary for LO generation are on the board. A 10 MHz TCXO from Fox provides the reference frequency. The on-board loop filter is set up for a 640 µA charge pump current and gives a loop bandwidth of 50 kHz. The VCO is the VCO790-1500T from Sirenza. The output is available at RF_{OUT} through a standard SMA connector.

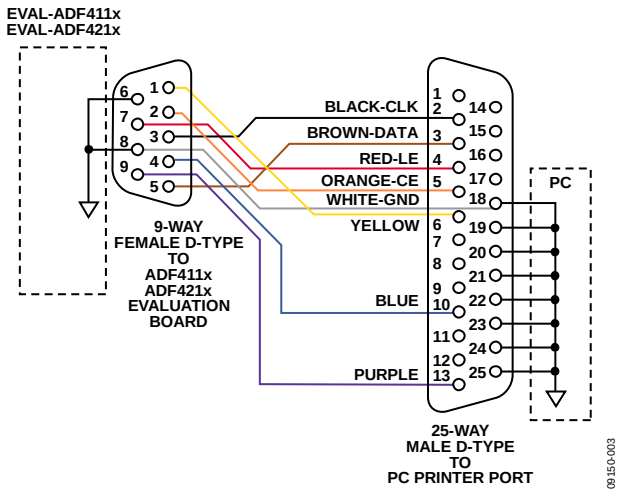

Figure 3. PC Cable Diagram

EVALUATION BOARD SOFTWARE

The control software for the EVAL-ADF4113HVEBZ1 is on the CD, which accompanies the board. Click on setup.exe to open the install wizard, which guides you through the install process. Simply follow the on-screen instructions. The software is installed in a default directory: C:/Program Files/Analog Devices/ADF4xxx. To run the software, double-click on ADF_Revx_x.exe.

Before the **Main Interface Page** opens, the device window appears, which prompts you to choose the device to be evaluated. Select **ADF4113HV** and click **OK**. The **Main Interface Page** window now opens (see Figure 4). To change the VCO output frequency and/or channel spacing, click the **RF VCO Output Frequency** text. The output frequency window opens and you can change this value. The other values under the **RF Section** can be changed in a similar manner. The window should be set up as shown in Figure 4 for the ADF4113HV evaluation board. Note that the charge pump current is set to the maximum. To program the ADF4113HV, click the **Resend Data** button and load the three registers.

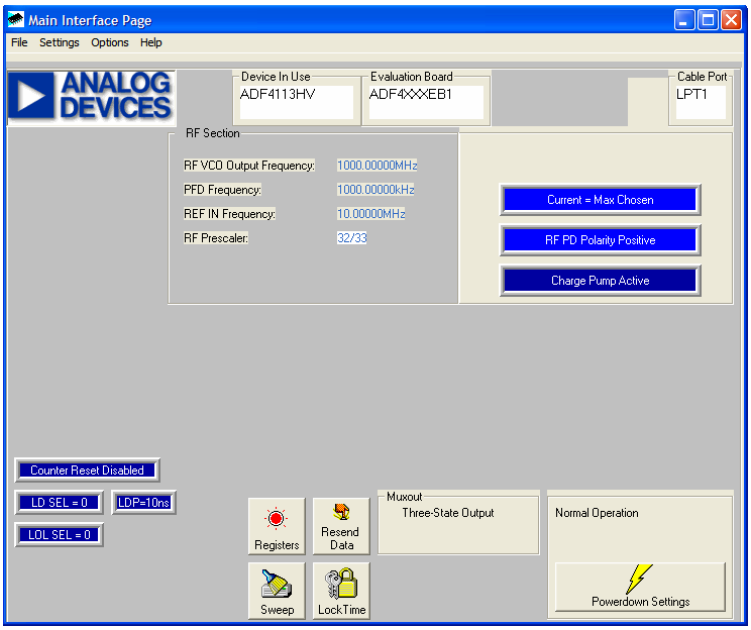

Figure 4. Software Front Panel

EVALUATION BOARD SCHEMATICS AND ARTWORK

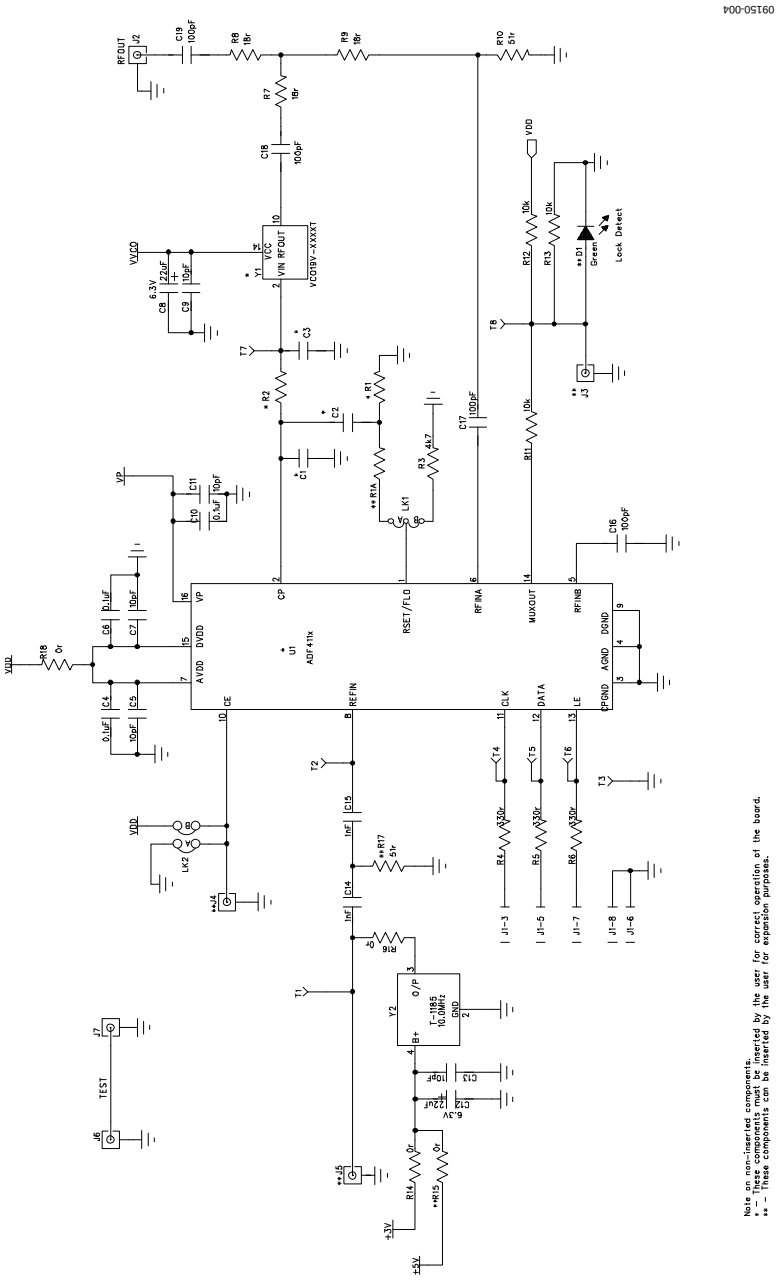

Figure 5. Evaluation Board Schematic (Page 1)

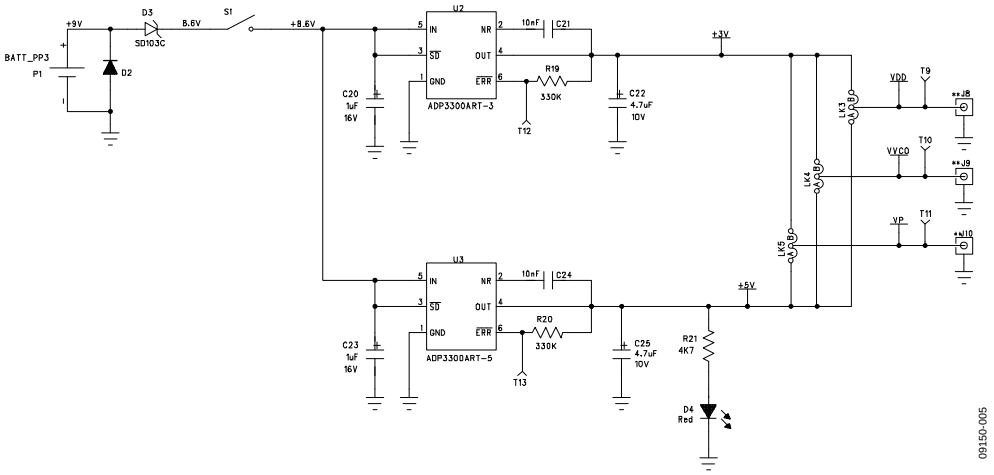

Figure 6. Evaluation Board Schematic (Page 2)

TEST SETUP

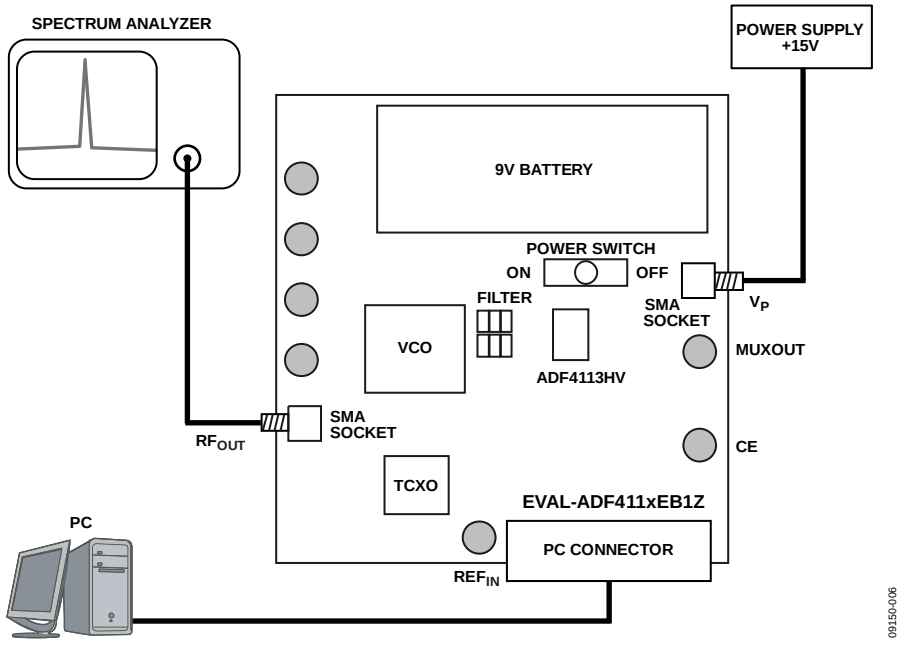

Figure 7. Test Setup

NOTES

NOTES

ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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